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Meeting Minutes Transmittal/Approval
Unit Managers' Meeting
Remedial Action and Waste Disposal Unit/Source Operable Unit
3350 George Washington Way, Richland, Washington
October 1999

APPROVAL: ______________________ Date 4-18-00
Glenn Goldberg/Chris Smith, 100 Area Unit Managers, RL (H0-12)

APPROVAL: ______________________ Date 4-20-00
Wayne Soper, 100 Aggregated Area Unit Manager, Ecology (B5-18)

APPROVAL: ______________________ Date 4-20-00
Dennis Faulk, 100 Aggregate Area Unit Manager, EPA (B5-01)

APPROVAL: ______________________ Date 4-20-00
Rick Bond, 100-N Area Unit Manager, Ecology (H0-18)

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Meeting minutes are attached. Minutes are comprised of the following:

Attachment 1	--	Agenda
Attachment 2	--	Attendance Record
Attachment 3	--	100 Area UMM Minutes - October 1999
Attachment 4	--	Potential Contaminants of Concern for 1607-H-2, H-4, F-2, and F-6
Attachment 5	--	Task Plan for the Small Diameter Geophysical Logging System Return on Investment Project
Attachment 6	--	100-D Near Reactor Pipeline Map
Attachment 7	--	116-B6-A Excavation Map

Prepared by: Amy J. Jones _______________ Date 3/30/00
Amy J. Jones (H0-10)/Tamen Rodriguez

Concurrence by: Vern R. Dronen _______________ Date 4/20/00
Vern Dronen, BHI Remedial Action and Waste Disposal Project Manager (H0-17)

Attachment 1

UNIT MANAGERS' MEETING AGENDA

3350 George Washington Way
October 21, 1999

1:00 – 4:00 p.m.   100 Area   2A01

100 N Area Remedial Action Specific Items

- N TSD ROD Status
- Area Con Contamination (AOC)
- Best Management Practice (BMP)

100 H, F, and K Areas Remedial Action Specific Items

- 116-H-7 Retention Basin Waste Site
- Sampling for Contaminants of Potential Concern for Septic Fields 1607-H-2, H-4, F-2, and F-6
- Concurrence on Waste Sites at 100-HR-1, to accomplish TPA Milestone M-16-26C
- Deep Vadose Zone Characterization Planning for 100 H, F, and K Areas
- Ash Pit 126-F-1 GeoProbe Technology Demonstration
- 100-H Proximity Sties

100 B/C and D Areas Remedial Action Specific Items

- Status of Cr6+ Kd-Leachability Testing (116-D-7 Site)
- 100-D Remedial Action/Pipeline Work Near Reactor
- Other (116-B6-A)
- 116-DR-9 Backfill

100 Area Remedial Action General Items

- TPA Milestones
- 100 Area Burial Ground Brief Status
- Radiologic Risk "Limit" in CVPs
- D&D Cleanup Values
- Hexavalent Chromium Field Screening
- Cleanup Verification Packages
- Status of RDR/SAP Revisions

Attachment 2

Remedial Action and Waste Disposal Unit Managers' Meeting
Official Attendance Record – 100 Areas
October 21, 1999

Please print clearly and use bank ink

PRINTED NAME	ORGANIZATION	O.U. ROLE	TELEPHONE
Chris Smith	DOE NAME	Project manager	372-1544
Thomas Kisenwether	BHI RAND	TASK Lead	531-0673
Alvin Langstaff	BHI	Task Lead	373-5876
Rich Doncher	BHI	Task Lead	372-9565
Rick Bond	ECY	100 N Area	736-3037
Mark Buckmaster	BHI	Eng	521-2089
John April	BHI	Task Lead	2-9632
Ella Coenenberg	CHI		2-5303
David Holland	Ecology	100-H	736-3027
Frank Corpuz	BHI	Proj. Engr.	373-1661
Mark Sturges	ERC	Resident Engr	531-0679

Attachment 2

Remedial Action and Waste Disposal Unit Managers' Meeting
Official Attendance Record – 100 Areas
October 21, 1999

Please print clearly and use bank ink

PRINTED NAME	ORGANIZATION	O.U. ROLE	TELEPHONE
RALPH WILSON	ERC-CHI	CVP Team	375-9432
Jon Fancher	ERC-CHI	100N RA	372-9610
Wayne Soper	Ecology	Cleanup PM	736-3049
Dennis Faulk	EPA	RPM	376-8631

MEETING MINUTES
REMEDIAL ACTION AND WASTE DISPOSAL
UNIT MANAGERS' MEETING -- 100 AREA
October 21, 1999

Attendees: See Attachment #2

Agenda: See Attachment #1

Topics of Discussion:

100 N Area Remedial Action Specific Items

1. N TSD ROD Status – Ecology is incorporating the N TSD ROD outstanding comments, and will provide a revised copy to EPA, RL and ERC for review. The revised ROD will incorporate language regarding the verification sampling activities for the 120-N-1 and 120-N-2 TSD sites. EPA requested a table listing all radiological and chemical constituents of concern, to be incorporated into the ROD.

   EPA also commented that the TSD ROD should be updated to include the EPA Institutional Controls Program. The ROD should use consistent terms used in the risk assessment section (i.e., frequent/occasional should be CRICA Ranger/Industrial) BHI stressed that the TSD ROD must be signed before BHI can issue a Request for Proposal (RFP). Attendees agreed that, although the RFP issuance is scheduled for December 1999, that all parties could meet the tight schedule to make the discussed changes by that time.

2. Area of Contamination (AOC) - ERC requested a separate meeting with the regulators to discuss extending the AOC. EPA stated that, although this can be discussed, requirements for AOC extension are very strict. EPA suggested that ERC Legal approve the proposed extension information, in order to stay within the legal definition of AOC.

3. Best Management Practice (BMP) – At the September meeting, ERC asked for regulator approval to implement a BMP to eliminate collection of decontamination wash water at the 100N remedial action. Ecology stated that they would like to review sample analysis of decontamination water after equipment excavated a portion of the soil column. ERC stated that they would provide representative, reasonable sample of decontamination wash water for analysis. Once this analysis is completed the results will be reviewed and a determination made whether future decontamination water needs to be contained or if the decontamination BMP used at other 100 Area sites may be fully implemented at the 100 N remedial action. ERC also stated that dry decontamination methods would be employed at sites prior to using wet methods.

100 H, F, and K Areas Remedial Action Specific Items

4. 116-H-7 Retention Basin Waste Site - ERC stated that obtaining samples beneath the grout found in the 116-H-7 waste site would be obtained if the DOE approves a baseline change proposal to fund the activity. Split samples would be provided to Ecology. Ecology requested standard and split samples of this material, to be processed on a quick turnaround basis.

5. Sampling for Contaminants of Potential Concern for Septic Fields 1607-H-2, H-4, F-2, and F-6 – ERC passed out a list of Contaminants of Potential Concern for these septic tank sites (Attachment 4). ERC requested concurrence on the list from the regulators, stating that work is in progress for the H Area sites and that verification sampling will begin soon (within the next month). In addition sampling of septic field/tank waste sites in the 100 Areas will be added to the Sampling Analysis Plan for future use. The regulators stated that they would review the list and contact ERC personnel if there were any questions/problems.

6. Concurrence on Waste Sites at 100-HR-1, to accomplish TPA Milestone M-16-26C – Ecology concurred on the list of sites for the 100 H Area. EPA stated that they would conduct a walkdown of the F Area sites prior to the next Unit Managers' Meeting.

7. Deep Vadose Zone Characterization Planning for 100 H, F, and K Areas – ERC discussed that the already-completed 100 D Area will serve as a model for this activity in the 100 H, F, and K Areas. Also, ERC plans to have one SAP and Data Quality Objectives (DQO) document to cover all the three areas. ERC plans to ask EPA if C Area test pit data could be used as an analogous site for the K Area.

8. Ash Pit 126-F-1 GeoProbe Technology Demonstration – ERC provided attendees with the test plan and a map (Attachment 5) for this activity. The intent of the demonstration is to see if the technology would help minimize the amount of waste. The regulators requested that, when ERC performs intrusive work at waste sites, ERC provide the regulators with sufficient advance notice to review information.

9. 100-H Proximity Sites – ERC has identified waste sites in the 100 H pipeline footprint and would like to add these to the 100 Operable Unit work activities. ERC/DOE will issue a letter requesting concurrence from the regulators with this request.

100 B/C and D Areas Remedial Action Specific Items

10. Status of Cr6+ Kd-Leachability Testing (116-D-7 Site) - ERC stated that the draft final report for this activity will be transmitted to RL and the regulators soon. The regulators discussed the application of the100 D/DR Area results to the 100 Area waste sites. After the regulators have reviewed the plan, ERC would like to meet with both the regulators and RL to discuss the document. At the present time, only Ecology concurrence is needed because the study is based on a 100 D/DR site.

11. 100-D Remedial Action/Pipeline Work Near Reactor – ERC handed out a map (Attachment 6) for the 100 D near-reactor pipeline work. ERC explained that the Decontamination and Decommissioning group (D&D) is currently working on the DR reactor (Interim Safe Storage Project), and in the course of work will be working in and around the Group 3 pipelines. Foundations that the Group 3 Subcontractor must currently protect will be demolished in the near future, therefore, it is more efficient to allow the D&D team to remove the pipelines near the reactor building as part of their future work. These segments of pipeline will be removed from the current Remedial Action Project work scope. Ecology concurred with this transfer as long as the pertinent remedial action goals match between the two groups.

12. Other (116-B6-A) – ERC provided a handout on 116-B6-A (Attachment 7), summarizing the analytical information gathered during an MRDS survey of the site sidewalls. The survey produced one sample with an abnormally high level of Cs-137. ERC had the lab recount the sample, producing an even higher result for Cs-137. The MRDS surveyors returned to the area where this sample was taken, but did not detect any "hot spots". ERC proposes to resample each node again, to either pinpoint the source of the high level or confirm that this sample is an anomaly. The ERC also proposes to use the mathematical average of the discrete nodes to represent the cleanup verification sample for this sidewall area. The regulators approved of the proposals.

13. 116-DR-9 backfill – ERC stated that the D Area subcontractor was given Notice to Proceed with 116-DR-9 backfill. The subcontractor will start backfill of the site soon.

100 Area Remedial Action General Items

EPA and Ecology requested that RL/ERC amend document transmittal letters, to copy the Hanford Project Manager (such as Douglas Sherwood, EPA and Steven Alexander, Ecology) for the appropriate area on the transmittal letter and do not send the attachments to these Hanford Project Managers. Unit Manager for each area would still continue to get correspondence and attachments as in the past. ERC took the action to amend the ghost attachment letter that is provided for RL's use when transmitting documents to the regulators.

In addition, it was clarified the appropriate regulator Unit Managers for each area are as follows:

EPA Unit Managers

100	B,C, F – Dennis Faulk
101	K – Larry Gadbois

Ecology Unit Managers

100 H	Dave Holland
100 D	Wayne Soper
100 N	Rick Bond

In addition, for Ecology Jane Hedges replaces Stan Leja for 100 Area correspondence.

14. TPA Milestones – EPA directed ERC to combine the milestones that will be missed. The combined milestone revisions should be completed in November, in time to be presented for approval at EPA's Inter-Agency Integration Committee.

15. 100 Area Burial Ground Brief Status (discussions continuing off line)

16. Radiologic Risk "Limit" in CVPs – Attendees all agreed that this language will be removed from Cleanup Verification (CVP) package documents. This information will be contained in the associated calculation brief packages for each waste site, but not in the CVP document.

17. D&D Cleanup Values – The action to standardize cleanup values and scenarios between the D&D and Remedial Action groups is in progress. EPA reiterated that the differences must be resolved in advance of commencing work on any EPA-lead sites.

18. Hexavalent Chromium Field Screening – SAP Requirements. ERC requested flexibility in the hexavalent chromium field screening for plumes. The regulators concurred that field screening or off site laboratory analysis for hexavalent chromium is acceptable, and where hexavalent chromium is not included as constituent of concern that field screening for hexavalent chromium plumes will not be required.

19. Cleanup Verification Packages – General/Status – ERC provided a general status and required actions for CVP documents that are scheduled for the immediate future.

    In the revised RDR/RAWP, ERC will include a CVP appendix. ERC proposed to document cleanup verification by referencing sites in the ROD and listing them in the RDR/RAWP appendix. This approach would make CVP packages smaller for most waste sites. Ecology stated that the standalone CVP would be more convenient for future reference. EPA suggested that standalone CVPs be issued, but each contain standardized data tables that can be used for future inclusion in the final NPL closeout for the 100 Areas. ERC also stated that some very small sites might not require a CVP in the format they currently exist.

20. Status of RDR/SAP Revisions – ERC plans to issue the revised SAP and RDR/RAWP documents by the end of 1999.

CONTAMINANTS OF CONCERN	POTENTIAL CONTAMINANTS OF CONCERN	Source	BASIS
	1607-H2 1607-H4	1607-F2	1607-F6
ICP Metals (Supertrace)			
Arsenic		LFI	>Lookup Value
	Lead	LFI	>Remedial Action Goal
	Chromium	LFI	Chrome VI
Chrome VI		LFI	>Lookup Value
	Mercury	Analogous site	>Lookup Value
	PCBs	Analogous site	>Lookup Value
SVOA		LFI & Analogous site	>Lookup Value
GEA			
Cesium 137		LFI	>Lookup Value
	Cobalt 60	Field Investigation	>Lookup Value
	Sr-90	Field Investigation	>Background
Isotopic Uranium			
U-234		Field Investigation & LFI	>Lookup Value
	U-235	Field Investigation	>Background
U238		Field Investigation & LFI	>Lookup Value

Attachment 5

0 7 3 1 0 7
Job No. 22192
Written Response Required: NO
Due Date: N/A
Actionee: N/A
Closes CCN: N/A
OU: N/A
TSD: N/A
ERA: N/A
Subject Code: 6800

Environmental Restoration Contractor **ERC Team**

Interoffice Memorandum

TO: J. G. April H0-17

DATE: September 20, 1999

COPIES: M. A. Buckmaster X9-10, w/a
S. W. Petersen H0-02, w/a
Document and Info Services H0-09, w/a

FROM: K. A. Bergstrom KAB
Geosciences/Modeling
H9-02/372-9591

SUBJECT: **TASK PLAN FOR THE SMALL DIAMETER GEOPHYSICAL LOGGING SYSTEM RETURN ON INVESTMENT PROJECT**

Attached is the completed task plan for the Small Diameter Geophysical Logging System (SDGLS) Return on Investment Project. Included with the task plan is a detailed schedule for the project.

If there are any questions contact Kevin Bergstrom at 372-9591 or Tom Mitchell at 372-9690.

KAB:pek

Attachment: Return on Investment Task Plan for Small Diameter Geophysical Logging System Pollution Prevention Project

Return on Investment Task Plan for

Small Diameter Geophysical Logging System (SDGLS)

Pollution Prevention Project

Authors

K. A. Bergstrom and T. H. Mitchell (CHI)

CONTENTS

FIGURES

TABLES

1.0 INTRODUCTION

Characterization and remediation of subsurface waste sites is usually difficult because of the cost and logistics of collecting even the most basic information on the inventory of buried waste (i.e., type and concentration of waste and location of waste). Accurate information on the attributes of the waste increases safety, reduces cost, and ensures environmentally sound remediation.

This test plan describes the guidelines for the demonstration and deployment of a Small-Diameter Geophysical Logging System (SDGLS). The SDGLS will be designed to collect data on the distribution of subsurface gamma-emitting radionuclides in the vadose zone. The SDGLS includes the equipment for pushing a small-diameter access hole, geophysical logging of the hole, decommissioning of the hole, analyzing the data, and reporting the results. The system is to be portable and easily deployed, and will provide significant cost savings relative to the current methods of drilling and logging. The field activities will be completed and will produce little to no waste.

The purpose of demonstrating the viability of the SDGLS is to reduce the cost of cleanup by minimizing the amount of contaminated soils being excavated and transported to the Environmental Restoration Disposal Facility (ERDF) for burial.

The demonstration and deployment of the SDGLS will be conducted in three phases:

- Phase I includes packaging currently available small-diameter boring equipment with compatible small-diameter logging equipment and testing and calibrating the packaged system.
- Phase II will include characterizing the demonstration site(s). The objective of Phase II will be to collect SDGLS data at a known waste site that has characterization data available from test pit(s) and/or characterization borehole(s). A comparison between the SDGLS data and the existing characterization data will be made. The three demonstration sites that are being considered for Phase II are the 216-B-2-2 Ditch, Gable Pond, and B Pond.
- Phase III will deploy the SDGLS at the 126-F-1 ash pit for subsurface contamination delineation. The objective of Phase III is to map the subsurface contamination area (i.e., gamma emitting radionuclides) within the ash pit.

The SDGLS will initially be used for locating and mapping gamma-emitting radionuclides, as described in this test plan. However, with further development, the SDGLS could provide additional information important to the characterization and remediation of selected waste sites. Potential future capabilities of the SDGLS include the following:

- Neutron moisture measure
- Density measure
- Beta data collection (in absence of cesium-137)

- Resistivity measure (incorporated into the probe at pushing).
- Passive neutron for fission identification.

2.0 BACKGROUND

2.1 AVAILABLE BORING TECHNOLOGY

Numerous existing boring technologies are available in the industry. The generalized boring systems that were considered are standard water well drilling techniques (e.g., rotary and cable tool), augers, and various "push" techniques (e.g., cone penetrometers). Geophysical logging is commonly associated with conventional boreholes (drilling) and large-diameter cone penetrometers (i.e., 4-in.-diameter hole or larger). However, in many cases these technologies do not provide significant value to remediation projects because of the high cost associated with creating the boreholes. Augering was eliminated due to waste minimization considerations and logistical and technical problems associated with logging the generated holes. A Geoprobe™ 5400 hydraulic driver is portable and is currently in the Environmental Restoration Contractor's (ERC's) equipment pool. A Geoprobe hole can provide a access into the subsurface that can be geophysically logged at significant cost savings.

Limitations of the Geoprobe relative to available boring technology or cone penetrometer techniques are the diameter of the hole and the depth of the hole. The inside-rod diameter (ID) typically used with the Geoprobe ranges from approximately 1.6 to 3.8 cm (0.625 to 1.5 in.). This ID is a major limiting factor for the type of geophysical logging tools that are currently available for use with small-diameter Geoprobe rods. The second limitation involves the effective depth of investigation with a Geoprobe rig varying significantly due to the inhomogeneity of the soil conditions at the Hanford Site. In general, the larger the diameter of the Geoprobe rod, the shallower the depth of the investigation.

2.2 AVAILABLE GEOPHYSICALLY LOGGING TECHNOLOGY

Several geophysical logging probes have been packaged to log through small-diameter Geoprobe push rods. The geophysical logging probe to be deployed under this test plan is a passive gamma-ray scintillation detector. Basically, passive gamma-ray instrument response and logging speed improves as the size of the crystal increases. Thus, the larger the rod ID, the larger the crystal that can be used. Also, the variety of tools readily available increases as the rod ID increases. The trade-off occurs through the increased difficulty of pushing the rod into the ground as the rod diameter increases.

The small-diameter passive gamma-ray scintillation detector is compatible with the 1-in. ID Geoprobe rods. The detector will be operated in spectral mode; however, practical operation of this small-diameter detector will be to sum the spectra counts at each depth interval to produce a gross gamma profile of the subsurface radioactivity. The radioactive contaminants are easily

™ Geoprobe 5400 is a registered trademark of Geoprobe Systems, Salinas, Kansas.

identified above the natural background radioactivity. This small-diameter logging system has been successfully deployed in a sonic cone penetrometer demonstration on the Hanford Site.

3.0 OBJECTIVES

The two main objectives of the SDGLS are to minimize waste (both during SDGLS field activities and during the site clean-up activity) and to reduce costs. The following examples show how these two objectives will be met.

- **Waste minimization**
  - Reduce excavation volumes
  - Reduce the amount of uncontaminated soils that are sent to ERDF
  - Eliminate waste during the sampling process.
- **Waste classification yielding cost reductions**
  - Confirmation sampling for site closeouts -- Rapid and cost-effective technique for confirming conceptual models and remedial decisions at sites not previously characterized.
  - Verification sampling along pipelines -- Determine if pipelines have leaked and contaminated the surrounding soil (i.e., extent of contamination).
  - Scoping studies -- Decide if a new discovery site should be a waste site; reclassification or rejection of existing waste sites.
  - Remedial investigation -- Tools to locate radioactive buried waste sites and to optimize the locations of characterization boreholes or soil sampling points. Assess horizontal extent of contamination. Data can be indexed against the Radionuclide Logging System (RLS) results for increased confidence. Rapid technique for confirming conceptual model.
  - Remedial design -- Cost-effective technique for confirming extent of contamination to support remedial design.
    - Assess volume of material requiring excavation
    - Assess barrier size requirements
    - Determine footprint of waste site for capping.
- **Verification sampling**
  - To confirm that remediation is complete and that remedial action objectives have been met.

- **Post-remediation/post-closure**
  - Monitoring sites requiring continuous monitoring to assess the effectiveness of remedial activity (e.g., barrier performance and monitored natural attenuation).

4.0 PHASE I -- SYSTEM CALIBRATION AND TESTING

During Phase I, the Geoprobe and geophysical logging system will be assembled, tested, modified, and calibrated.

4.1 GEOPROBE PREPARATION/TESTING

A key to the success of the SDGLS will be the ability to push the Geoprobe rods to the desired depths with minimum distortion of the push rods. Several different types and sizes of rods will be purchased and tested to determine which are the best rods and to determine the configurations for obtaining the desired depths. Several modifications to the existing Geoprobe will be necessary to maximize its performance. Planned modifications include installation of a pressure gauge and a two-channel recorder.

All holes created with the SDGLS will be decommissioned using proper decommissioning protocol, as established by the Washington State Department of Ecology. The most effective and cost-efficient methods for decommissioning the holes will be established during the preliminary testing of the system.

4.2 GAMMA LOGGING PREPARATION

To prepare the logging equipment and tool for use, it must be calibrated and packaged into a system that can be used in a small-diameter hole.

4.2.1 Potassium, Uranium, and Thorium Calibrations

Spectral gamma-ray scintillation detectors used in geophysics are generally calibrated with the natural radionuclides (i.e., potassium, uranium, and thorium). These elements are of particular interest because their relative concentrations provide geologic information. Calibration models at the Hanford Site are traceable to National Institute of Science and Technology standards and will be used to calibrate the instrument.

Although the detector will be calibrated in models containing only natural radionuclides (e.g., thorium), the logging data can be used to identify zones containing gamma-emitting contaminants. Contamination intervals will be easily identified as zones of increased gross gamma activity that exceed the natural thorium concentrations of the formation.

The most basic calibration would use energy windows covering the major gamma contributions from each element. This conventional window-stripping technique has been used in the oil well logging service since the early 1960s. A more statistically precise method (not proposed in the present scope of work) uses energy-dependent basis vectors for each element. The combination of these basis vectors would then be least square-fit to the observed spectra at each sample depth.

4.2.2 Cesium/Cobalt Calibrations

It is possible to calibrate the proposed scintillator detector for cesium-137 and cobalt-60 by making a transfer standard using the high-purity germanium (HPGe) logging systems run on Hanford Site wells. The HPGe logging system generates rigorous values for gamma-emitting contaminants. Cesium and cobalt have been detected in several logged wells on the Hanford Site. These data will be used for the assignment of calibration coefficients to the proposed scintillator response.

The energy signature of both cesium and cobalt is simple and easily resolved with the scintillator detector. Cesium and cobalt are the most common gamma-emitting contaminants observed at the Hanford Site.

The SDGLS will deploy an existing gamma detector, with a 2.12-cm (0.835-in.) outside diameter. Cesium-137 and cobalt-60 stripping factors will be estimated by logging near suitable existing boreholes that already have HPGe logging data.

4.2.3 General Data Analysis

Direct detection of thorium or thorium/cesium/cobalt is possible with the proposed small diameter instrument, given enough signal or logging time. The most cost-effective method of radionuclide detection would use an indirect method for any radio-isotope species. The indirect method will use gross gamma above the natural (background) level to assign a concentration for a given radionuclide. This technique coupled with the possible specific identification of thorium and thorium/cesium/cobalt at selected depth intervals will yield a map of contamination with the potential identification for the most common radionuclides found at the study site. Similar indirect methods of contaminant measure can be generated for other radionuclides but are recommended for later phases of the project.

4.2.4 Software Modification

Two separate software components will be used: one component to acquire detector responses, and one component to process the raw detector responses.

- Acquire detector responses -- Data collection software exists for acquiring and storing spectra from the detector. However, some modifications may be identified through the testing phases of this project.

- Data processing -- Basic software for the energy-window techniques of spectral processing exists for thorium and thorium/cesium/cobalt concentrations from scintillator detectors. Calibration coefficients required for the energy-window technique will be established from the calibration data to be acquired in the thorium calibration models.

Modification of the software will include the insertion of a gross gamma level above which contaminated depth intervals will be identified.

Indirect analysis of radionuclides from the gross gamma response may be generated as modifications to the existing analysis software. Modifications of the analysis software for the statistical enhancement of the results is also envisioned.

4.3 TESTING AND CALIBRATION SITES

Testing and calibration of the SDGLS will be conducted at several locations on the Hanford Site. The initial testing will be conducted near the 300 Area (Figure 1).

The objective of the testing in the 300 Area will be evaluate the Geoprobe's push capabilities under variable geologic conditions using different rod configurations and sizes. Measurements of the rod distortion relative to the different rod diameters and wall thickness will be made. The Geoprobe will have a pressure gauge and pen recorder installed to assist in evaluating the effectiveness of the Geoprobe. The geophysical logging equipment will also be assembled, tested, and deployed in the Geoprobe rods that have been pushed to depth at these locations.

The second group of test locations are existing wells that have previously been logged with a HPGe logging system. The primary objective of this phase of testing is to compare the data from the HPGe logging system to the SDGLS. The HPGe logging system is used as the standard for spectra gamma geophysical logging systems at the Hanford Site. The wells will be logged with the SDGLS and compared with the HPGe logging system results.

The third test location will be at the area containing the calibration models, which are located at the Hanford Site Weather Station, east of the 200 West Area. The models will be used to calibrate the SDGLS. These models are used for calibration and verification of the HPGe logging system.

4.4 DATA ANALYSIS AND EVALUATION

The planned data analysis includes generating the gross gamma response of the detector. From calibration data, limits will be established for the natural thorium background levels. Therefore, depths where the measured gross gamma exceeds these limits indicate detectable levels of man-made radionuclides. Analysis will generate these indications, and the log plots will demonstrate such indications.

Further extrapolation of the calibration for the indirect assignments of radionuclide concentration from the gross levels above natural levels is possible but is currently not within the scope of this project.

When the gross gamma response greatly exceeds the natural levels, then longer count time spectra will be acquired. These spectra will be analyzed for the possibility of identifying the radionuclide species present.

Intensity maps for detected radionuclide contamination will be generated based on the gross gamma as a function of depth at each probe location.

5.0 FIELD LOGISTICS

There are necessary procedural and safety steps that need to be completed prior to implementing field activities. The implementation of these activities are not specifically part of this test plan but are the responsibility of the project team. The following list identifies the pre-survey activities, many of which are necessary before deployment of the SDGLS in the field:

- Establish borehole identification numbers
- Acquire excavation permit
- Perform cultural/ecological review
- Perform air and water quality evaluation
- Acquire drilling start cards
- Hazardous waste operations permit/site safety plan
- Obtain Radiation work permit
- Obtain hot work permit
- Complete ALARA management worksheet
- Obtain Davis-Bacon Act Determination
- Complete safety assessment
- Complete ERC Team safety inspection checklist
- Complete personnel training
- Prepare site evaluation letter
- Complete ALARA checklist
- Conduct waste disposal planning
- Complete well specification/design
- Ensure that mechanical equipment is selected and ready
- Develop/revise procedures and protocol.

The logistical steps and procedures that must be followed to enter and collect SDGLS data will coordinated through the Bechtel Hanford Inc. Field Service group.

6.0 PHASE II -- SDGLS TESTING AND DEMONSTRATION SITES

The primary purpose of Phase II is to collect SDGLS data from known waste sites that have existing borehole(s) and or test pit(s) data. The 216-B-22 Ditch, B Pond, and Gable Mountain Pond (Figure 2) are the candidate sites for the demonstration phase. The final sites selection will be based on site access requirements. Each of these sites have characterization data from ongoing or past activities that will include data from borehole(s) and test pits. The SDGLS data will be compared to the data from the borehole(s) and test pit(s). Each of the three sites have different soil conditions and a potential for shallow subsurface gamma radionuclide contamination.

To date, the 216-B-2-2 Ditch has geologic and sampling data available from a borehole (ID # B8079) and a test pit. Three additional test pits are planned for the fall of 1999. The borehole also has geophysical logs (i.e., HPGe spectral gamma and moisture). The site was recently used for a cone penetrometer demonstration.

The B Pond has five test pits and a characterization borehole planned for the fall of 1999. The Gable Mountain Pond has 15 test pits and a characterization borehole planned for the fall of 1999.

The SDGLS data will be collected at five to 10 locations at one, and possibly at all three, of these sites. The SDGLS data will be compared to the data from the boreholes and test pits. A value-added assessment will be made, comparing the cost of the information using standard characterization techniques (i.e., boreholes and test pits) to the data obtained using the SDGLS. The SDGLS data will also provide additional information that may be useful in remediating these sites.

7.0 PHASE III – SDGLS PROJECT SUPPORT AT THE 126-F-1 ASH PIT

The 126-F-1 ash pit (Figure 3) is an inactive solid waste site that received coal ash from the 184-F Powerhouse. The site is an irregularly shaped depression located east of the 100-F retention basin.

Large but unquantified amounts of coal ash were sluiced with raw Columbia River water to this pit. The site is radioactively contaminated due to leakage from the reactor effluent lines that pass through the pit area. Most of the effluent leakage is believed to have been contained with an earthen dike in the late 1940s. The sluice pipe extended through the dike to a point many meters farther south where a new ash pit was established. The new area is a radiation control area, but the contamination levels are low. The SDGLS will be used to aid in assessing the extent of the gamma contamination.

7.1 SURVEY APPROACH

It is anticipated that data will be collected with the SDGLS at 30 to 50 points within the 126-F-1 ash pit. Figure 4 shows the approximate locations of the data points. Each sample point will have a well identification number and will be located using the Global Positioning System (GPS).

7.2 DATA COLLECTION

Continuous gross gamma data will be collected from the ground surface down to approximately 5 m (16 ft) at each location. Extended count time spectra gamma data will be collected at selected locations of subsurface contamination.

7.3 DATA ANALYSIS

Analysis of the gross gamma attributes of each will push point will be conducted. Selected data will have spectral analysis performed as discussed in Section 4.4.

7.4 REPORT PRESENTATION TO THE PROJECT

A summary report will be prepared that will include the results from the 126-F-1 ash pit data. The testing and calibration data pertinent to the 126-F-1 ash pit data will be included in the final report for the SDGLS, which is schedule to be completed in March 2000.

8.0 DETAILED SDGLS EVALUATION

The final report will include the results of all testing and calibration, the 126-F-1 ash pit investigation, and the results from the demonstration site.

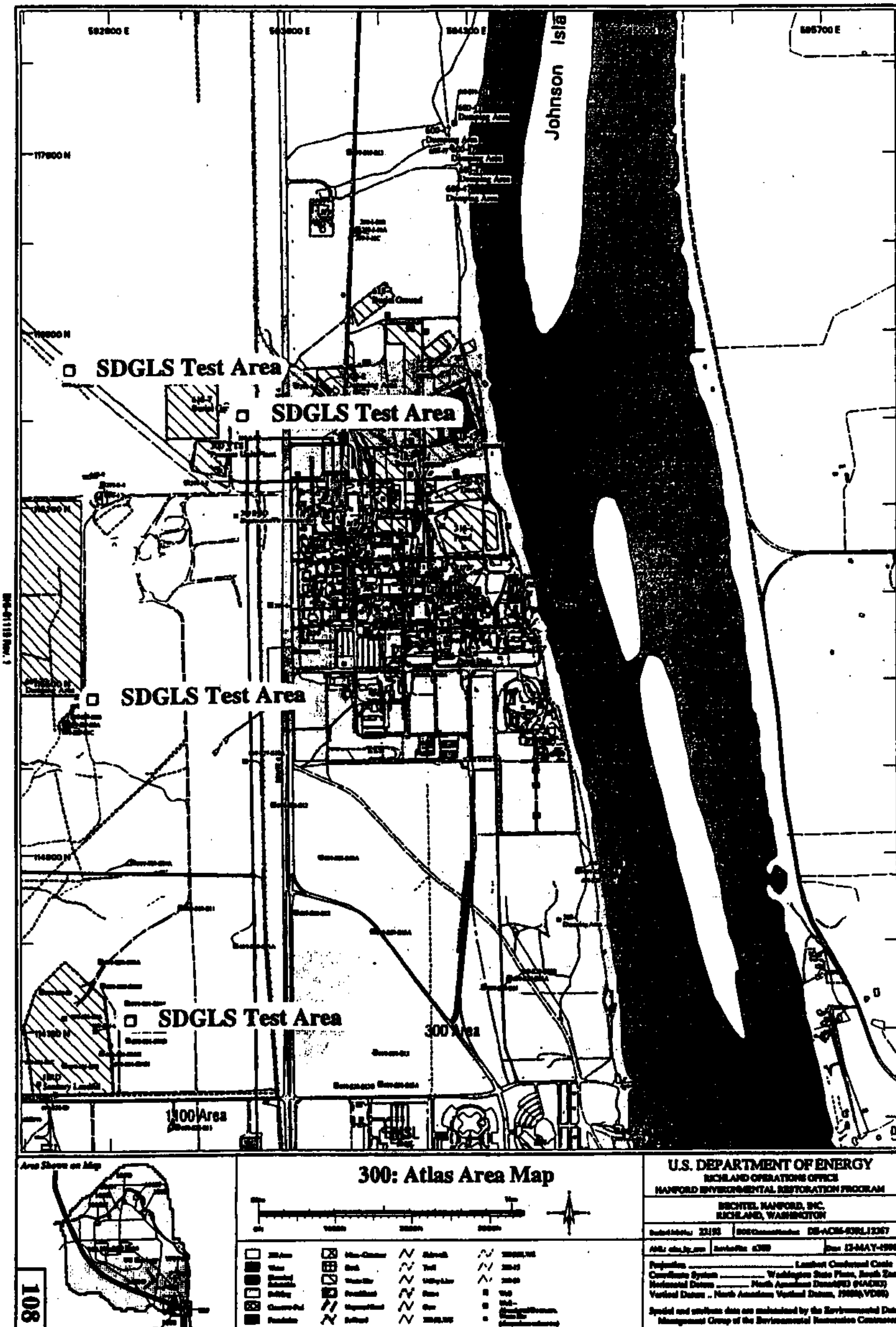
The final report will include the following:

- Detailed description of the baseline SDGLS and its capabilities
- Testing and calibration results
- Testing results lessons learned
- Results from the demonstration sites
- 126-F-1 ash pit results/lessons learned
- Recommendations for improving the baseline SDGLS
- Technology development
- Procedure of SDGLS operations
- Recommendations for modifications to the Geoprobe/push system to make it a more mobile, efficient, and low-cost operation
- Modifications that improve the resolution of the logging system
- Cost estimates for a "production" SDGLS
- Cost benefit analysis comparing the SDGLS to other characterization techniques.

Additional recommendations/technology developments that may be addressed in the closure report include the following:

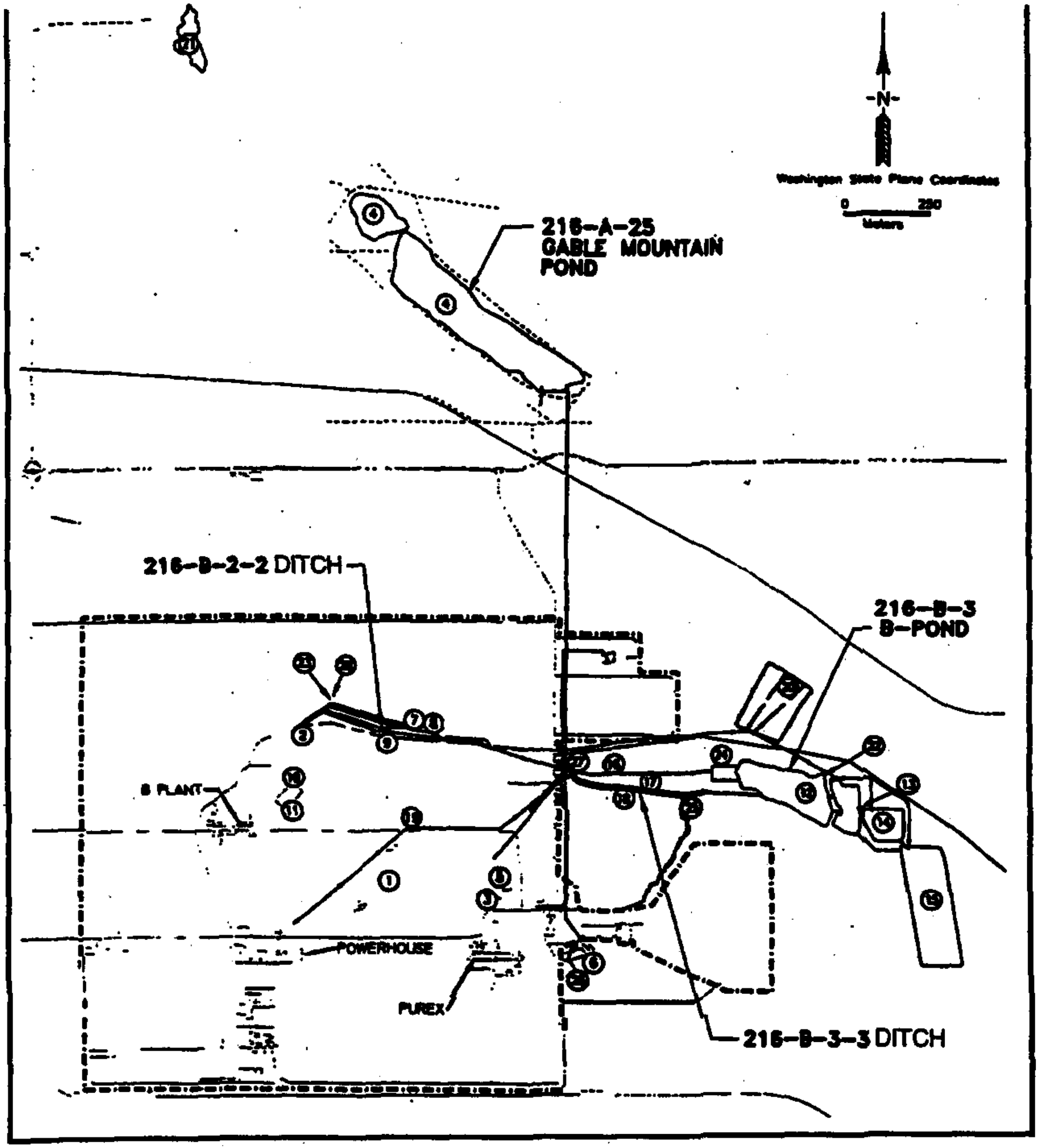
- Neutron moisture measurement
- Density measurements in a small-diameter rod
- Alternate moisture measurements (e.g., neutron-gamma)
- Beta data collection (in absence of cesium-137)
- Resistivity measurements (incorporated into the probe at pushing)
- Passive neutron for fission identification.

Figure 1. 300 Area Test Site Location Map.



Attachment 5

Figure 2. Location of Demonstration Sites 216-B-2-2 Ditch, Gable Pond, and B Pond.



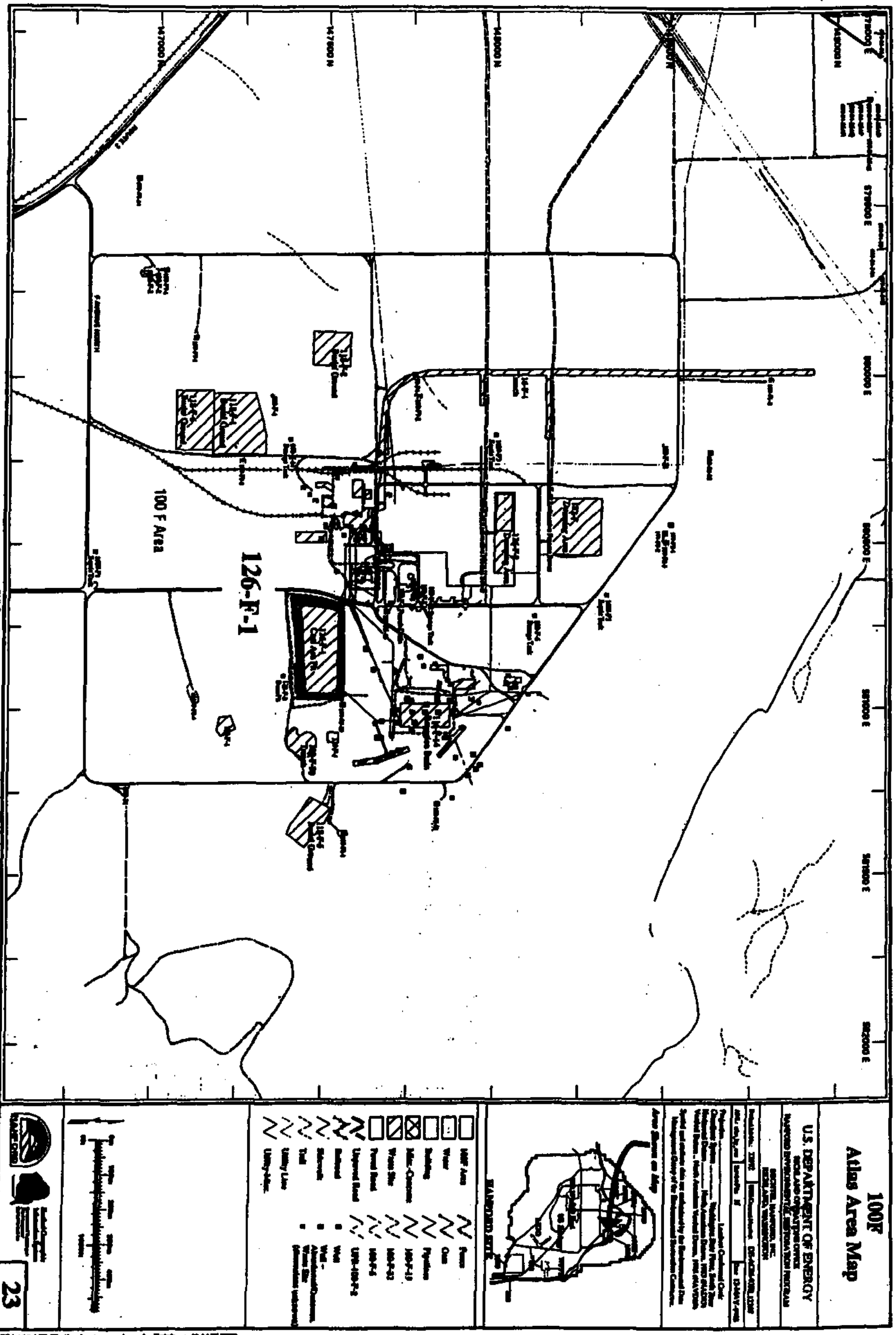
LEGEND

200 EAST FENCELINE

1= 200-E PD	8= 216-B-2-2	15= 216-B-3C RAD	22= UPR-200-E-14
2= 207-B	9= 216-B-2-3	16= 216-B-3-1	23= UPR-200-E-32
3= 216-A-9	10= 216-B-59	17= 216-B-3-2	24= UPR-200-E-34
4= 216-A-25	11= 216-B-59B	18= 216-B-3-3	25= UPR-200-E-51
5= 216-A-40	12= 216-B-3	19= 216-C-9	26= UPR-200-E-66
6= 216-A-42	13= 216-B-3A RAD	20= 216-E-28	27= UPR-200-E-94
7= 216-B-2-1	14= 216-B-3B RAD	21= 216-N-8	28= UPR-200-E-138

Figure 3. 126-F-1 Ash Pit Location Map.

Attachment 5



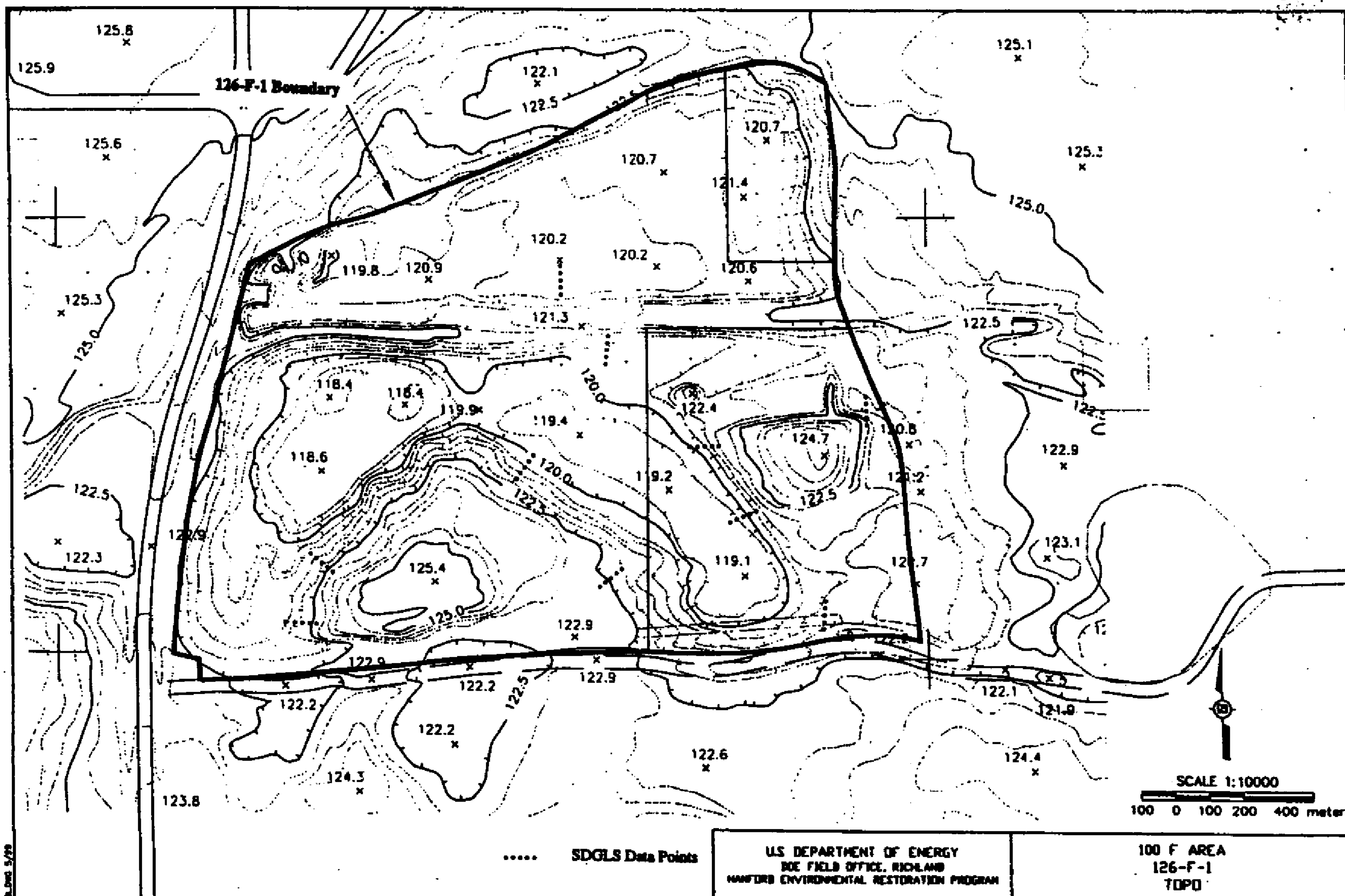
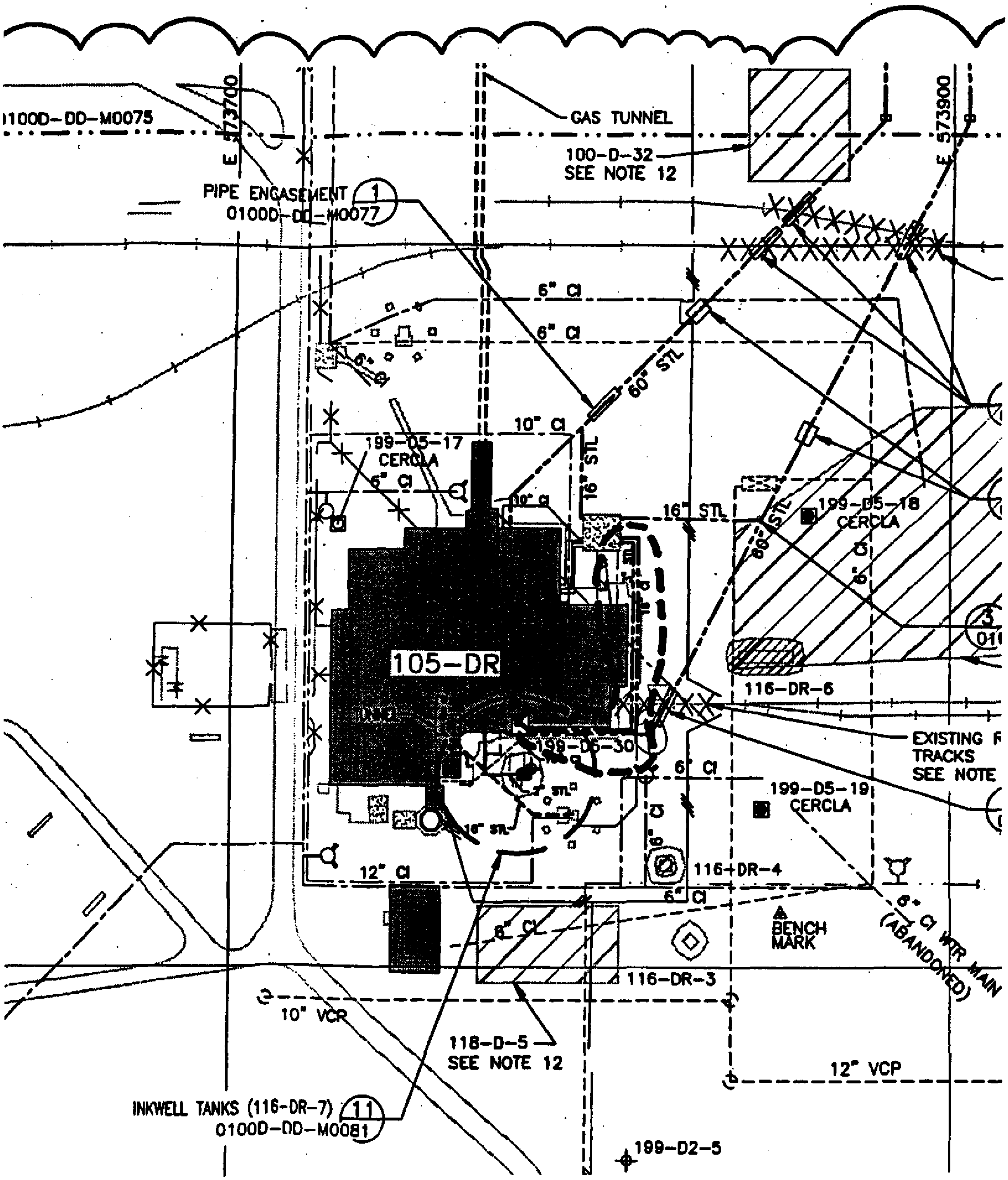


Figure 4. Proposed Push Locations for the 126-F-1 Ash Pit.

Attachment 6



116-B-6A and 116-B-16 Update

Problem: The remediation and backfill of these sites are part of TPA milestone requirements. Suspected high Cs-137 activity could cause a delay in the cleanup verification process.

Details:

- Shallow zone sample Area A4 cleanup verification sample result for Cs-137 was 37.1 pCi/g. The 15 mrem/yr lookup value is 6.2.
- To verify that the high value was not a lab error the sample was recounted. The new result was 70.3 pCi/g.
- MRDS (NaI) surveys at each sample node location indicated activity ranging from background to approximately two times background. No high activity areas were observed.

Plan:

Samples will be collected from each node and analyzed for Cs-137 (i.e. GEA). If individual node locations are clean, then a new cleanup verification sample will be obtained.

If the individual node location results indicate a "hot spot", the area will be excavated and resampled.

The schedule for this effort is contingent upon funding, therefore, the possibility of missing or rescheduling the TPA milestone should be considered.

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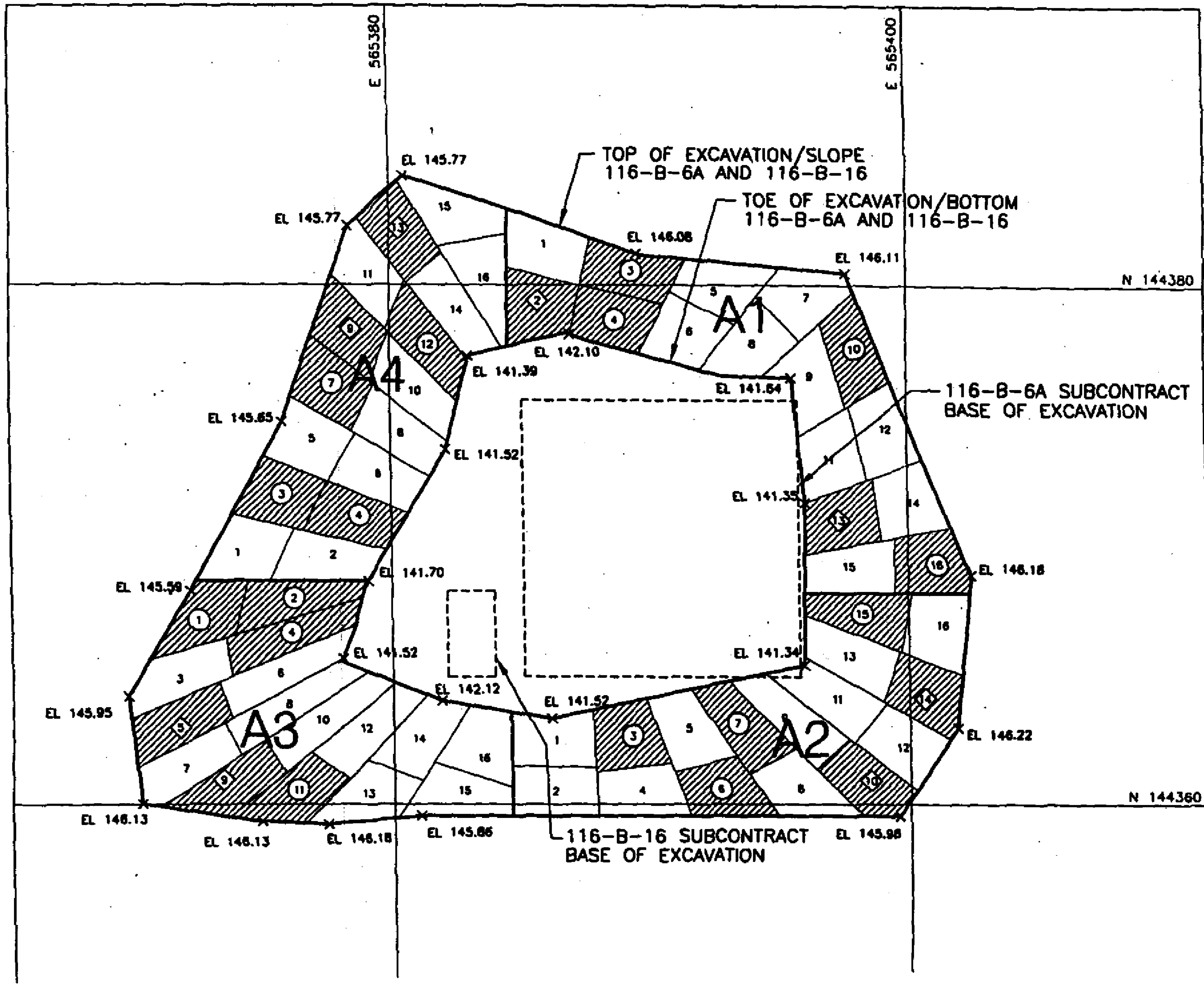

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Attachment 7

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Distribution

Unit Managers' Meeting: 100 Area Remedial Action Unit/Source Operable Units

Glenn Goldberg	DOE-RL, RP (H0-12)
Owen Robertson	DOE-RL, RP (H0-12)
Chris Smith	DOE-RL, RP (H0-12)
Eileen Murphy-Fitch	DOE-RL (H0-12)
Lisa Treichel	DOE-HQ (EM-442)
Wayne Soper	WDOE (Kennewick) (B5-18)
Rick Bond	WDOE (Kennewick) (B5-18)
Dennis Faulk	EPA (B5-01)
Lynn Albin	Washington Dept. of Health
Richard Jaquish	Washington Dept. of Health
John April	BHI (H0-17)
Ella Coenenburg	BHI (H9-03)
Frank Corpuz	BHI (X9-06)
Rick Donahoe	BHI (H0-17)
Jon Fancher	CHI (H9-02)
Alvina Goforth	BHI (H0-09)
Chris Kemp	BHI (S3-20)
Tom Kisenwether	BHI (X9-10)
Alvin Langstaff	BHI (X3-40)
Tamen Rodriguez	BHI (H0-17)
Fred Roeck	BHI (H0-17)
Mark Sturges	CHI (X3-40)
Joan Woolard	BHI (H0-02)
Administrative Record	BHI (H0-09)

Please inform Tamen Rodriguez (372-9562) – BHI (H0-17)
of deletions or additions to the distribution list.